



Make Your Own Sandstone

★ TEKS

Science - Ch112

Grades 2-6
Duration 90min
Setting Classroom

K.1 K.5 K.7 K.10 1.1 1.5 1.7 1.10 2.1 2.5 2.7 2.10 3.1 3.5 3.7
3.11 4.1 4.5 4.7 4.11 5.1 5.5 5.7 5.12

Focus Introduce 3-Classes of Rocks.

➡ Read side 2 for Background.

Objective The student's task is to create a sandstone rock.

- Procedure**
1. Prepare the 2liter bottles by cutting them in half around their diameter. Do this in preparation for the project.
 2. Have each student cover their workspace with newspaper. Distribute the materials.
 3. Distribute strips of masking tape, and have the students write their names on them, then apply the tape to their cut-off two liter.
 4. Have each student fill their measuring cup with $1\frac{1}{2}$ cups (400ml) of sand, then pour their sand into the cut-off 2liter bottle.
 5. Now the students can measure out $1\frac{1}{4}$ cups (300ml) of plaster of Paris; add it to the sand in their cut-off bottle; and mix the two materials well with their spoon.
 6. Once the mixture seems thorough, guide the students through slowly adding the $1\frac{1}{4}$ cups of water to the sand and plaster while mixing carefully. *Note: The consistency should be fluid, but not too runny and the water should be mixed to penetrate the shapes at the bottle's bottom.*
 7. Leave the mixtures to set overnight. Quickly clean-up any errant plaster splatters. *Plaster becomes rock hard once its set.*
 8. The following day, help each student cut away the plastic of their bottle, to find their sandstone.
 - To which of the rock classes does sandstone belong?
 - Where did the water in this mixture go?

Materials

Per Student

- 1 large measuring cup
- $1\frac{1}{4}$ cup water
- 1 clear 2-liter plastic bottle
- scissors
- wooden spoon
- plaster of Paris
- fine grained sand
- masking tape
- marker



Did You Know?

Some of the world's oldest rocks called Vishnu Schist are found at the bottom of the Grand Canyon. Geologists estimate their age at up to 2 billion years old.

➡ Read side 2 for Background.



Make Your Own Sandstone

Background

The Ultimate Summary: Rocks make up the hard crust of the Earth. Rocks are composed of mixtures of different minerals. Examples of rocks include granite, limestone, and marble. Quartz, feldspar, mica and calcite are examples of minerals that make up these rocks.

Geologists classify rocks and minerals according to their properties. Properties include hardness, texture, luster (shine), color, and shape. Since a rock is actually composed of different minerals, it can have various combinations of color, shape, and hardness.

Rocks are classified as **igneous**, **sedimentary**, and **metamorphic**. Igneous rocks, which make up 95% of the Earth's crust, are formed from hot, molten magma that has cooled and hardened. Sedimentary rocks form when rock particles naturally cement together. They form when beds of clay, sand, gravel, or limestone shells are pressed together in layers. These rocks are pushed upward, creating hill, mountains, and valleys. Metamorphic rocks are rocks that have melted down and altered their basic structure due to pressure and heat.

One of the Family: The Earth's crust is made up of dozens of different types of rocks, but each forms in one of these three ways:

- **Born to Flow**—Igneous rocks form when magma cools and hardens. This happens both above ground and below ground. Some igneous rocks form underground when magma that is pushed up toward the crust cools and crystallizes before it reaches the surface. Granite, gabbro, and dolerite are three kinds of igneous rocks that form underground. But other igneous rocks such as basalt and obsidian form on the Earth's surface when lava cools and hardens. (Molten rock below ground is **magma**; once it's above ground it's called **lava**.)
- **The Layered Look**—Sedimentary rocks are layered rocks. Most get their start as wind, ice, and water wear down rocks into bits of sand, soil, mud, pebbles, clay and other loose sediment. As this sediment washes into rivers, lakes, and oceans, it piles up, layer upon layer. Over time, as the pressure on the bottom layers increases, the sediment compacts and cements together to form solid rock. For example, sandstone is a sedimentary rock that is made up of layers of compressed and cemented sand grains (usually quartz). And shale is a sedimentary rock made up of layers of mud (very fine-grained quartz, feldspar, and clay minerals.)

Sometimes sedimentary rocks form by the evaporation of water that contains various substances dissolved in it. When the water evaporates, the minerals

crystallize. Two examples of sedimentary rocks that form in this way are halite (formed from dissolved sodium chloride) and some types of limestone (formed from dissolved calcium carbonate).

Coal, chalk, and a few other sedimentary rocks form from organic material, such as the shells, skeletons, and other parts of plants and animals. For example, shellfish can remove calcite dissolved in the water they live in and use it to build their shells. When these animals die, their shells pile up on the bottom and limestone often forms as the shells become cemented together.

- **The Pressure's On**—When igneous and sedimentary rocks are subjected to intense heat and pressure deep within the Earth, their mineral composition and grain size can change, and they become metamorphic rocks. For example, metamorphism can recrystallize the calcite grains in limestone into a larger size, forming marble. And shale, when subjected to intense heat and pressure, changes into the metamorphic rock called slate. You can often see new mineral in metamorphic rock, such as garnets, as well as once-flat sedimentary layers that have been bent and twisted from the heat and pressure.



Did You Know?

Diamonds and graphite (the "lead" found in pencils) contain atoms of only one element, carbon. However, the patterns of their atoms are not the same. And what a difference it makes!

Bibliography & Sources

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